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Energy, Protein, Fat and Carbohydrate Intakes in Children with Wasting Syndrome at SDN 2 Tlanak Kedungpring, Lamongan District

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ABSTRACT

In school-age children, the body will later need energy and macronutrients for growth, physical activity and other skills. The purpose of this study was to describe the energy, protein, fat and carbohydrate intakes in children with wasting syndrome at SDN 2 Tlanak Kedungpring, Lamongan Regency. The research design used is descriptive observational. The sample consisted of 30 respondents. The technique used was 2 x 24-hour food recall interviews. The research time starts from October 2022-March 2023. The analysis technique used is univariate or descriptive. The results of this study showed that 20 respondents (66.6%) had energy consumption levels in the severe deficit category, 28 respondents (93.3%) had carbohydrate consumption levels in the severe deficit category, 13 respondents (43.4%) had protein consumption in the category of weight deficit and as many as 13 respondents (43.4%) had a level of fat consumption in the normal category. The conclusion of the study was that most children with wasting syndrome had normal levels of energy, carbohydrate and protein intake, deficits in weight and fat. The hope of this study is to provide an impetus for parents and the school to pay attention to children's food so that nutritional needs can be met.

INTRODUCTION

Nutritional problems are still a health issue that is very concerned, one of which is undernutrition. Undernutrition is divided into four types, namely: wasting, stunting, underweight and micronutrient deficiency.[1] Wasting is a reflection of nutritional imbalances caused by dietary errors and parenting or the role of parents in daily life.[2] Wasting is a combined term of severe wasted and wasted.[3] School children are measured using the BMI/Age index, which is said to be thin if the z-score value is -2 elementary to -3 elementary school, while it is said to be very thin if the z-score value is <-3 elementary school.[4] The impact of wasting on school children will cause a high risk of illness and even death in children.[2] Factors that cause wasting are still lack of energy consumption and lack of consumption of diverse foods.[5]

Based on data from the global nutrition report in 2018, 7.5% of children in the world experience wasting.[6] Based on Basic Health Research in 2018, in children aged 5-12 years with a BMI/Age index, the national prevalence of underweight was obtained at 6.8% while the prevalence of being very thin was 2.4%. East Java Province has a thin prevalence of 5.8% and a very thin prevalence of 2.23%. Lamongan Regency has a thin prevalence of 5.37% and a very thin

prevalence of 2.88%. Wasting is still one of Indonesia's nutritional problems, the standard *of wasting* according to it is said to be medium if the prevalence is 5-<10%, it is said to be high if it is 10-<15% and it is said to be very high if it is 15%.[7]

Lamongan Regency has a total of 638 elementary schools, consisting of public and private elementary schools. Kedungpring sub-district has 31 elementary schools, consisting of public and private. One of them is SDN 2 Tlanak Kedungpring. The selection of SDN 2 Tlanak Kedungpring is easy access and availability of adequate resources. Based on a preliminary survey conducted on October 29, 2022 at SDN 2 Tlanak Kedungpring, Lamongan Regency. The sample used amounted to 20 people, determined randomly. Anthropometric measurements with BMI/Age indicators obtained results of 25% of children had wasting nutritional status, 5% had obesity risk nutritional status and as many as 70% had normal nutritional status. The socio-economic condition of the local community is to make a living as farmers, where the economy is classified as middle to lower.

Nutrient intake is a supply of foods that contain nutrients, where the body needs these nutrients for growth.[8] School children are a time when children actively play, explore and move, food intake is a very important factor in achieving optimal growth and development.[9] Lack of nutrition in children will affect intelligence or learning productivity (cognitive), motor and nervous system disorders.[10] This study aims to determine the consumption of energy, protein, fat and carbohydrates in children with wasting at SDN 2 Tlanak Kedungpring Lamongan Regency.

MATERIALS AND METHODS

This type of research is qualitative with a descriptive method. The descriptive method is research that presents a picture of a problem and the characteristics of both individuals and groups systematically, factually and accurately.[11] The research site is at SDN 2 Tlanak Kedungpring, Lamongan Regency starting from October 2022-March 2023. The population in this study amounted to 88 respondents. The sample of 30 respondents was determined by *purposive sampling technique. Purposive sampling* is a sampling method according to criteria determined by researchers that aims to provide relevant information.[12] Then the data are analyzed by univariate or descriptive analysis.

RESULTS

Characteristics of respondents

Table 1. Frequency distribution by age

Age	n	%
6 year	1	3.3
7 year	4	13.3
8 year	9	30.0
9 year	5	16.7
10 year	5	16.7
11 year	4	13.3
12 year	2	6.7
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, it is known that, the total respondents amounted to 30 students, the highest number at the age of 8 years as many as 9 respondents (30%).

Table 2. Gender frequency distribution

Gender	n	%
Male	16	53.3
Female	14	46.7
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, it is known that there were 30 respondents, men 16 respondents (53.3%) and women 14 respondents (46.7%).

Nutritional Status

Table 3. Frequency distribution of wasting nutritional status

Nutritional Status	n	%
Underweight	24	80.0
Very thin	6	20.0
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, the number of respondents was 30 people, the nutritional status was underweight was 24 respondents (80%) and very thin was 6 respondents (20%).

Table 4. Cross-tabulation of wasting nutritional status by gender

Gender	Nutritional Status					
	Underweight		Very thin		Total	
	n	%	n	%	n	%
Male	16	53.3	0	0	16	53.3
Female	8	26.7	6	20	14	46.7
Total	**24**	**80.0**	**6**	**20.0**	**30**	**100**

Source: Primary Data, 2023

From the table above, 16 respondents (53.3%) were men with underweight nutritional status. A total of 8 respondents (26.7%) with underweight nutritional status and a total of 6 respondents (20%) with very thin nutritional status were female.

Macronutrient Consumption Rate

Table 5. Frequency distribution of energy consumption rates

Energy Consumption Level	n	%
Severe Defiency	20	66.6
Moderate Deficiency	6	20.0
Mild Deficiency	2	6.7
Normal	2	6.7
Excess	0	0
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, 20 respondents (66.6%) had energy consumption levels in the weight deficit category and 2 respondents (6.7%) had energy consumption levels in the normal category.

Table 6. Frequency distribution of carbohydrate consumption levels

Carbohydrate Consumption Level	n	%
Severe Defiency	28	93.3
Moderate Deficiency	2	6.7
Mild Deficiency	0	0
Normal	0	0
Excess	0	0
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, 28 respondents (93.3%) had a level of carbohydrate consumption in the weight deficit category and 2 respondents (6.7%) had a level of carbohydrate consumption in the moderate deficit category.

Table 7. Frequency distribution of protein consumption rates

Protein Consumption Level	n	%
Severe Defiency	13	43.3
Moderate Deficiency	8	26.7
Mild Deficiency	6	20.0
Normal	2	6.7
Excess	1	3.3
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, 13 respondents (43.3%) had a level of protein consumption in the weight deficit category and 1 respondent (3.3%) had a level of protein consumption in the more category.

Table 8. Frequency distribution of fat consumption levels

Fat Consumption Level	n	%
Severe Defiency	7	23.3
Moderate Deficiency	6	20.0
Mild Deficiency	4	13.3
Normal	13	43.4
Excess	0	0
Total	**30**	**100.0**

Source: Primary Data, 2023

From the table above, 7 respondents (23.3%) had a level of fat consumption in the weight deficit category and 13 respondents (43.4%) had a level of consumption in the normal category of fat.

Cross-tabulation of macro nutrient consumption levels with wasting nutritional status

Table 9. Cross-tabulation of energy consumption rates with wasting nutritional status

Energy Consumption Rate	Nutritional Status					
	Underweight		Very thin		Total	
	n	%	n	%	n	%
Severe Defiency	15	50.0	5	16.7	20	66.7
Moderate Deficiency	5	16.7	1	3.3	6	20.0
Mild Deficiency	2	6.7	0	0	2	6.7
Normal	2	6.6	0	0	2	6.6
Excess	0	0	0	0	0	0
Total	**24**	**80.0**	**6**	**20.0**	**30**	**100**

Source: Primary Data, 2023

From the table above, 15 respondents (50%) of underweight nutritional status and 5 respondents (16.7%) of very thin nutritional status have energy consumption levels in the weight deficit category. 2 respondents (6.6%) underweight nutritional status had energy consumption levels in the normal category.

Table 10. Cross-tabulation of carbohydrate consumption levels with wasting nutritional status

Carbohydrate Consumption Rate	Nutritional Status					
	Underweight		Very thin		Total	
	n	%	n	%	n	%
Severe Defiency	22	73.3	6	20	28	93.3
Moderate Deficiency	2	6.7	0	0	2	6.7
Mild Deficiency	0	0	0	0	0	0
Normal	0	0	0	0	0	0
Excess	0	0	0	0	0	0
Total	**24**	**80.0**	**6**	**20.0**	**30**	**100**

Source: Primary Data, 2023

From the table above, 22 respondents (73.3%) with underweight nutritional status and 6 respondents (20%) with very thin nutritional status had carbohydrate consumption levels in the weight deficit category. 2 respondents (6.7%) underweight nutritional status had carbohydrate consumption levels in the moderate deficit category.

Table 11. Cross-tabulation of protein consumption rates with wasting nutritional status

Protein Consumption Rate	Nutritional Status					
	Underweight		Very thin		Total	
	n	%	n	%	n	%
Severe Defiency	10	33.4	3	10	13	43.4
Moderate Deficiency	6	20.0	2	6.7	9	26.7
Mild Deficiency	5	16.7	1	3.3	5	20.0
Normal	2	6.6	0	0	2	6.6
Excess	1	3.3	0	0	1	3.3
Total	**24**	**80,0**	**6**	**20.0**	**30**	**100**

Source: Primary Data, 2023

From the table above, 10 respondents (33.4%) underweight nutritional status and 3 respondents (10%) very thin nutritional status had a level of protein consumption in the weight deficit category, 2 respondents (6.6%) thin nutritional status had a level of protein consumption in the normal category and 1 respondent (3.3%) underweight nutritional status had a level of protein consumption in the more category.

Table 12. Cross-tabulation of fat consumption rates with wasting nutritional status

Fat Consumption Rate	Nutritional Status					
	Underweight		Very thin		Total	
	n	%	n	%	n	%
Severe Defiency	5	16.7	2	6.6	7	23.3
Moderate Deficiency	4	13.3	2	6.7	6	20
Mild Deficiency	4	13.3	0	0	4	13.3
Normal	11	36.7	2	6.7	13	36.7
Excess	0	0	0	0	0	0
Total	**24**	**80.0**	**6**	**20.0**	**30**	**100**

Source: Primary Data, 2023

From the table above, 5 respondents (16.7%) of underweight nutritional status and 2 respondents (6.6%) of very thin nutritional status had a level of fat consumption in the weight deficit category. 11 respondents (36.7%) underweight nutritional status and 2 respondents (6.7%) very thin nutritional status have a level of fat consumption in the normal category.

DISCUSSION

From the results of the study, some respondents had the age of 8 years, totaling 9 respondents (30%). There are several factors that affect growth and development, one of which is age, the older the growth and development are also maturing. School is a period of physical growth and development that continues until adolescence and adulthood. Eating habits and foods that are liked and disliked in adolescence and adulthood are a reflection of eating habits eaten at school age or childhood.[13] Children who have an improper diet and insufficient nutritional intake, will be vulnerable and at risk of wasting.[14]

In addition to age, another characteristic of respondents is gender. Based on the research conducted, it is known that the male gender is more dominant than women, amounting to 16 respondents (53.3%). Gender is a biological trait that is carried from birth. There are differences in

energy needs, and macronutrients of men and women because men have greater physical activity, muscle mass and posture than women.[15] Boys' physical activity is usually in the form of playing football, cycling, volleyball and so on. So, because of the large number of activities, the intake that enters is not in accordance with the energy expended. Gender is one of the internal factors that determine daily nutritional needs so that there is a correlation between male and female sex.[16] The study is in line with research on third grade elementary school children in Sungai Lilin who found that men are more likely to have malnutrition and undernutrition (20.6%) than women (8.5%).[17]

From the results of the study, it was found that 24 children (80%) were thin and 6 children (20%) were very thin. In addition, the results showed that 16 respondents (53.3%) were boys with underweight nutritional status, while a total of 6 respondents (20%) were girls with very thin nutritional status. Nutritional status is a condition that can be described physically, lack or excess nutrition will usually be seen from the physical state.[18] Factors that cause boys to have very thin nutritional status are physical activity, posture and muscle mass of men who are greater than girls.[15] As for girls, they are more dominant in having a very thin nutritional status due to improper food selection, which tends to prefer snack foods rather than nutritious foods and usually girls do not like vegetables. From this, it will have an impact on anemia when adolescents.[19] The research is in line with research conducted in elementary schools in Rangsang District, Meranti Islands Regency, which stated that the nutritional status of very thin women is greater than that of men, namely (69.2%).[20]

Protein Energy Deficiency is a result of lack of energy and protein intake or a manifestation of the body's inability to meet daily energy and protein needs.[21] From the results of the study, it was known that 15 respondents (50%) of underweight nutritional status and 6 respondents (20%) of very thin nutritional status had a level of energy consumption in the weight deficit category. The average amount of energy intake of respondents was 1,000-1,100 kcal. The main diet consists of staple foods of rice and noodles, animal side dishes, vegetables and almost no one consumes fruits. Snacks consumed are usually snacks, chiki, fried foods and drinks. Although respondents have eating habits as described earlier, the portion eaten in small quantities and the type of food ingredients vary less in each meal. This is what causes most children still lack protein, fat and carbohydrates, so they experience a lack of energy. This research is in line with research that states that the level of energy consumption of wasting children in Mandalasari village, Garut Regency, most (76%) are in the deficit category.[22]

The function of carbohydrates in the body is the main energy producer in providing energy.[23] Lack of carbohydrate consumption can cause a decrease in energy, fatigue, as well as decreased concentration. From the results of the study, it was found that 21 respondents (70%) underweight nutritional status and 6 respondents (20%) very thin nutritional status had a level of

carbohydrate consumption in the weight deficit category. Sources of carbohydrates that are often consumed in the form of rice and noodles. But most respondents still lack carbohydrates, this is because the number of staple foods eaten in small portions or not in accordance with their needs. Respondents also proved to still like to consume snacks, where these snacks are low in nutrients. The average amount of carbohydrates consumed by respondents was 120-140 gr. This research is in line with research which states that some students of Madrasah Ibtidaiyah Wachid Hasjim in 2020 who have thin nutritional status (wasting) get a weight deficit carbohydrate intake of 88.7%.[24] Similarly, research states that in grades 4, 5 and 6 of SDN Tuadale underweight nutritional status has less carbohydrate intake by 26.7% and very thin nutritional status who have less carbohydrate intake by 56.7%.[25]

Protein intake has a correlation with student learning achievement, adequate protein intake will increase children's achievement.[26] Protein deficiency in children can cause impaired mental development, affecting brain intelligence because protein has a function as growth and development.[27] From the results of the study, it was found that 5 respondents (16.7%) of underweight nutritional status and 2 respondents (6.6%) of very thin nutritional status had a level of protein consumption in the weight deficit category. This study found that most respondents only ate once, twice a day or not at all eating protein sources, where each meal only one type of protein source with almost the same type every day. For example, respondents only ate 1 small piece of vegetable protein in the morning and 1 small piece of animal protein during the day. This is what causes respondents to mostly experience the level of protein intake with a weight deficit category. The average amount of protein intake of respondents was 25-35 gr. The results of this study are in line with research at Madrasah Ibtidaiyah Wachid Hasjim in 2020 which has a thin nutritional status *(*wasting*)* getting a weight deficit protein intake of 36%.[24] Likewise, the study stated that in grade 4, 5 and 6 children at SDN Tuadale, 8 people (26.7%) had underweight nutritional status and 16 very thin nutritional status people had less protein intake.[25]

Fat is one of the largest energy producers for the body, besides that fat also functions as the absorption of fat-soluble vitamins. The impact of fat deficiency is lack of energy, vitamin deficiency and absorption of other nutrients.[28] From the results of the study, it was found that 11 respondents (36.7%) of underweight nutritional status and 2 respondents (6.7%) of very thin nutritional status had normal category fat consumption levels. From this study, it is known that respondents with normal category fat consumption levels are more dominant than respondents with weight deficit consumption levels. It can be interpreted that the needs of fat in the body have been met. The average amount of fat intake of respondents was 40-60 gr. This is because most of the food consumed by respondents undergoes the frying process, in one day can consume 3-4 times fried foods both from the main meal and interlude. This study is in line with research that says that children who have very thin nutritional status have a normal category fat consumption level of 102%

of the RDA, and very thin nutritional status has an adequate level of normal category fat intake of 101% of the RDA.[29]

CONCLUSION

The characteristics of respondents include having an age of 8 years (30.0%) and 16 respondents (53.3%) male. The nutritional status of underweight was 24 respondents (80%) and very thin was 6 respondents (20%). A total of 20 respondents (66.6%) with wasting nutritional status had energy consumption levels in the weight deficit category. 28 respondents (93.3%) with wasting nutritional status had a level of carbohydrate consumption in the weight deficit category. 13 respondents (43.4%) with wasting nutritional status had a level of protein consumption in the weight deficit category. 13 respondents (43.4%) with nutritional status Wasting have a normal level of fat consumption.

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